

# Reserve Pits

## *Mortality Risks to Birds*

### What is a Reserve Pit?

A reserve pit is an earthen pit excavated adjacent to a drilling rig and is commonly used for the disposal of drilling muds and fluids in natural gas or oil fields. The contents of a reserve pit depends on the type of drilling mud used, the formation drilled, and other chemicals added to the well bore during the drilling process.

### What is in a Reserve Pit?

Drilling fluids in reserve pits contain barium sulfate or barite, bentonite clay, lignosulfonates, and lignites. Drilling fluids in reserve pits can also contain diesel, mineral oil, glycols, chromium, zinc, polypropylene glycol, and acrylamide copolymers.

Fluids used in the hydraulic fracturing of a well are sometimes stored in reserve pits. Hydraulic fracturing fluids can contain surfactants and other chemicals used to stimulate oil or natural gas flow.

### How Do Reserve Pits Kill Birds?

If the reserve pit contains oil or oil-based products (i.e. oil-based drilling fluids), the pit can entrap and kill migratory birds and other wildlife. During the drilling process, reserve pits probably do not attract aquatic migratory birds such as waterfowl due to human activity and noise. However, once the drilling rig and other equipment are removed from the well pad, the reserve pit is attractive to birds and other wildlife.

Birds are attracted to reserve pits by mistaking them for natural bodies of water. The sticky nature of oil



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*Reserve pits remaining after well completion attract birds and other wildlife.*

entraps birds in the pits and they die from exposure and exhaustion. Birds and other wildlife can also fall into oil-covered reserve pits when they approach the pit to drink.



*Reserve pit next to a drilling rig in the Pinedale Anticline in Wyoming*

### Why Do Reserve Pits Remain After Well Completion?

Following well completion, reserve pits are left in place after the drilling rig and other equipment are removed from the site. Reserve pit fluids are allowed to dry and the remaining solids are encapsulated with the reserve pit synthetic liner and buried in place. Depending on state regulations oil operators are allowed from 30 days to one year after well completion to close a reserve pit, depending on state regulations.

The longer the reserve pit is left on site, the greater the probability that aquatic birds will land on the pit. If the reserve pit contains oil, condensates, or other hydrocarbons or hydraulic fracturing fluids, the risk of bird mortality is very high. Hydraulic fracturing fluids can

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*Oil-covered duck carcass in reserve pit containing oil.*

contain surfactants, which can also cause bird mortality.

### What Can Be Done?

Bird and other wildlife mortality in reserve pits is preventable. Several states require the netting or screening of reserve pits containing oil to prevent access by wildlife. Immediate

removal of the drilling fluids after well completion is the key to preventing wildlife mortality in reserve pits.

The best option is to eliminate the use of open reserve pits and use closed-loop drilling systems. Pitless drilling systems are equipped with a “chemically-enhanced” centrifuge that separates drilling mud liquids from solids. The separated drilling mud solids are stored in a steel tank and then transferred to a synthetically-lined clay pad for drying. The pads are designed to prevent the runoff of any liquids. The drill cuttings are either buried on site or are transferred to an approved commercial disposal facility for disposal.

If reserve pits must be used, cost-effective technology exists to solidify pit fluids immediately following well completion. Solidification can add

### Solutions to the Problem

- Pitless or Closed-Loop Drilling
- Treatment and reuse of drilling fluids
- Downhole disposal of drill cuttings
- Solidification of drilling wastes

to the waste volume but prevents mobilization of potential contaminants into the soil and/or groundwater.

Solidification involves the removal of the free liquid fraction of reserve pit fluids and then adding solidifiers such as commercial cement, fly ash, or lime kiln dust.

Downhole disposal of drill cuttings is another option and is used in Alaska’s North Slope. The drill cuttings are ground down and mixed with drilling fluids and injected underground.

New technology exists to separate the drilling fluid into pure water, heavy brine, condensate, and methanol. The condensate is recovered and sold. The methanol, and brine are reused in drilling fluids. The pure water is either reused at other drilling locations or is used for the benefit of livestock or wildlife.

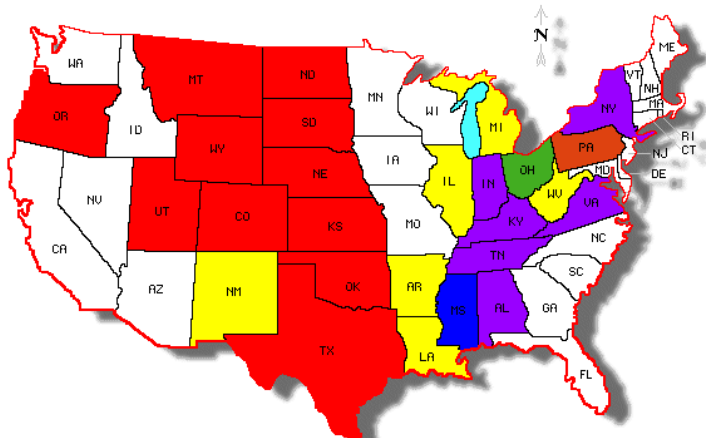
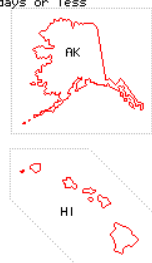


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*Reserve pit with visible oil and sheens on the surface.*

### Reserve Pit Closure in Days

- - 365 days
- - 270 days
- - 180 days
- - 150 days
- - 90 days
- - 45 days or less



*Maximum number of days allowed for closure of reserve pits following well completion (state regulation requirements as of Jan. 2009).*

### For more information contact:

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**Visit the Environmental Contaminants web sites:**  
<http://www.fws.gov/contaminants/>  
<http://mountain-prairie.fws.gov/contaminants/oilpits.htm>

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